

<mark>ସରକାରୀ ସ୍ୱୟିଂଶାସିତ ମହାବିଦ୍ୟାଳୟ, ରାଉରକେଲା</mark> GOVERNMENT AUTONOMOUS COLLEGE, ROURKELA Sundargarh, Raghunathpali, Rourkela, Odisha



GOVERNMENT AUTONOMOUS COLLEGE

GREEN AUDIT REPORT 2022 - 2023

PREPARED BY EHS ALLIANCE SERVICES





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CERTIFICATE



CERTIFICATE

PRESENTED TO

GOVERNMENT AUTONOMOUS COLLEGE

Raghunathpali, Rourkela, Odisha 769004

Has been assessed by EHS Alliance Services for the comprehensive study of environmental impacts on institutional working framework to fulfill the requirement of



ACADEMIC YEAR 2022-23

The green initiatives carried out by the institution have been verified on the report submitted and was found to be satisfactory.

The efforts taken by the management and the faculty towards environment and sustainability are appreciated and noteworthy.



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ACKNOWLEDGEMENT

EHS Alliance Services would like to thank the management of Government Autonomous College for assigning this important work of Green Audit. We appreciate the co-operation to the teams for completion of assessment.

We would also like to thank *Dr. Lichita Patro (Asst. Professor, Department of Botany) – Audit Coordinator*, for her continuous support and guidance, without which the completion of the project would not have been possible. We are also thankful to other staff members who were actively involved while collecting the data and conducting field measurements.

We are also thankful to

Smt. Rameshwari Bhoi Asst. Professor - Department of Political Science Dr. Pratap Kumar Swain Asst. Professor - Department of Chemistry Mr. C. P. Ranjan Asst. Professor - Department of Political Science

Last but not the least, we would like to thank *Dr. Bijaya Kumar Behera – Principal* for giving us an opportunity to evaluate the environmental performance of the campus.







DISCLAIMER

EHS Alliance Services Audit Team has prepared this report for Government Autonomous College based on input data submitted by the representatives of college complemented with the best judgment capacity of the expert team.

While all sensible care has been taken in its preparation, details contained in this report have been compiled in good faith based on information gathered.

It is further informed that the conclusions are arrived following best estimates and no representation, warranty or undertaking, express or implied is made and no responsibility is accepted by Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report.

If you wish to distribute copies of this report external to your organisation, then all pages must be included.

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Signature LEAD AUDITOR



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CONCEPT AND CONTEXT

The National Assessment and Accreditation Council, New Delhi (NAAC) has made it mandatory from the academic year 2019–20 onwards that all Higher Educational Institutions should submit an annual Green, Environment and Energy Audit Report. Green Audit is assigned to the Criteria 7 of NAAC, National Assessment and Accreditation Council which is a self-governing organization of India that declares the institutions as Grade A, Grade B or Grade C according to the scores assigned at the time of accreditation. Moreover, it is part of Corporate Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the reduction of global warming through Carbon Footprint reduction measures.

In view of the NAAC circular regarding Green auditing, the College management decided to conduct an external environment assessment study by a competent external professional auditor. The green audit aims to examine environmental practices within and outside the college campus, which impact directly or indirectly on the atmosphere. Green audit can be defined as systematic identification, quantification, recording, reporting and analysis of components of college environment. It was initiated with the intention of reviewing the efforts within the institutions whose exercises can cause risk to the health of inhabitants and the environment.

Through the green audit, a direction as how to improve the structure of environment and inclusion of several factors that can protect the environment can be commenced. This audit focuses on the Green Campus, Waste Management, Water Management, Air Pollution, Energy Management & Carbon Footprint etc. being implemented by the institution. The concepts, structure, objectives, methodology, tools of analysis, objectives of the audit as below:





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Now a days, the educational institutions are becoming more thoughtful towards the environmental aspects and as a result new and innovative concepts are being introduced to make them sustainable and eco-friendly. To preserve the environment within the institution, a number of viewpoints are applied by the several educational institutes to solve their environmental problems such as promotion of the saving the energy, waste recycle, water consumption reduction, water harvesting and many more...

The activities carried out by the institution can also create adverse environmental impacts. Green audit is defined as an official inspection of the effects a college has on the environment. Green Audit is conducted to evaluate the actual scenario at the institution campus. Green audit can be a useful tool for a university /college to determine how and where they are using the most of the energy or water or resources; the institution can then decide how to implement changes and make savings. It can also be used to determine the nature and volume of waste, which can be used for a recycling project or to improve waste minimization plan.

Green auditing and the application of mitigation measures is a win-win situation for all the institutions, the learners and the mother earth. It can also result in health awareness and can promote the environmental awareness, values and beliefs. It provides a better understanding to staff and students about the Green impact on institution. Green auditing also upholds financial savings through reduction of resource usage. It gives an opportunity to the students and teachers for the development of ownership of the personal and social responsibility. The audit process involves primary data collection, site walk through with the team of university /college including the assessment of policies, activities, documents and records.





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OVERVIEW OF THE COLLEGE

The College started as Rourkela Science College from 16 th August, 1961 and was taken over by Government Odisha on 01-07-1963. With the vertical academic growth of the College was conferred with autonomous status in 2002. In the year 2002 the College was accredidated by NACC with Grade-B.The College offer variety of Courses at different levels. Besides Art, Science and Commerce at Higher Secondary and Degree levels the College also offers Master Degree in 17 subjects and M.Phil in 03 subjects i.e. Botany, English and Odia.M.Sc in Computer Science, Maste in Commerce, Degree Courses in Computer Science, Electronics and Tele-Communication(ETC), Mathematics with Computer(MTC), PGDCA, PGDCH come uner Self-finance courses. The College also offers various Degree and P. G. level Courses under Odisha State Open University. The College has been also provided separate Rooms for IGNOU Study Centre. As per the Circular of the Department of Higher Education Government of Odisha the College now stands Bi-furcated in to the Government Autonomous College, Rourkela with effect from Academic Session 2001-2002.Ironically the number of staff both teaching and non-teaching have gone-down after it was Autonomous. There by the Classes are engaged by Guest faculty who are engaged time to time.



The College has not received any UGC grant for last three years. Remuneration for non-teaching is paid from the fee collected from the students, as there is no special grant for the Government for this purpose. This has been a hindrance in achieving our mission of academic excellence to



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make this premier Institute , a centre of quality learning by training the students to be creative and competitive enough to face the challenges of the new millennium.

MISSION & VISION

MISSION

To achieve Academic Excellence by giving impetus and adapting to measures for Enhancing Effective Quality Sustenance and Progression on all key facets of Education. Providing a Dynamic and Conducive Environment for all in order to Inculcate, Infuse, Imbibe, Equip and Disseminate Value Oriented Learning, Creativity, Innovation, Societal Consciousness to achieve Sustainable Livelihood.

VISION

To achieve Academic Excellence by giving impetus and adapting to measures for Enhancing Effective Quality Sustenance and Progression on all key facets of Education. Providing a Dynamic and Conducive Environment for all in order to Inculcate, Infuse, Imbibe, Equip and Disseminate Value Oriented Learning, Creativity, Innovation, Societal Consciousness to achieve Sustainable Livelihood.

Facilities in the campus

Amenities at Government Autonomous College provide far more than academic and administrative facilities on campus. It is dedicated to provide students with an exceptional infrastructure for learning as well as facilities for simplifying the procurement of fundamental skills. To accomplish the goal, Government Autonomous College offers the following:

GREEN CAMPUS: The Institute has an impressive and pollution-free campus with panoramic green surroundings, elegant landscaping and beautiful flowerbeds.

SPORTS ACTIVITIES: Spending quality time is never a problem in the Institute. Evenings find students enjoying the pleasure of these sports as players and audience.

MESS: The institute has its huge mess, which serves healthy and nutritious cuisines to its students.



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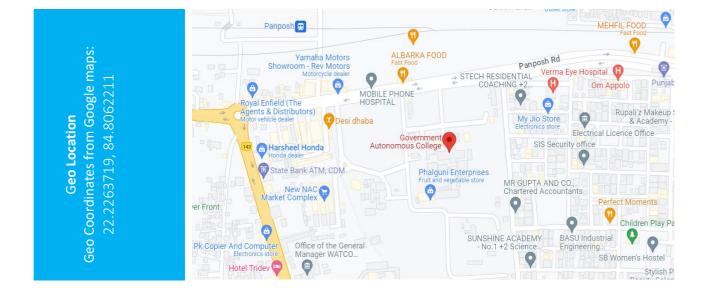
CANTEEN: The institute has its own canteen, which serves healthy and nutritious food to its students at subsidized rates. The menu varies from spicy samosas, wafers to full-meals.





CAFETERIA

AUDITORIUM







AUDIT PARTICIPANTS

On behalf of Government Autonomous College

Name	Designation
Dr. Bijaya Kumar Behera	Principal
Smt. Rameshwari Bhoi	Asst. Professor - Department of Political Science
Mr. Choudhury Pardosh	
Ranjan	Asst. Professor - Department of Political Science (IQAC Cordinator)
Dr. Smruti Snigdha Mishra	Asst. Professor - Department of Chemistry
Mr. Sameer Saurava Prusty	Asst. Professor - Department of Zoology
Dr. Pratap Kumar Swain	Asst. Professor - Department of Chemistry
Dr. Bishwanath Parija	Asst. Professor - Department of Physics
Dr. Parbhudutta Mohanty	Asst. Professor - Department of Computer Science
Dr. Niranjan Sahu	Asst. Professor - Department of Physics
Dr. Lichita Patro	Asst. Professor - Department of Botany
Mr. Prashant Kumar Sethi	Asst. Professor - Department of Botany
Dr. Abeg Jaiswal	Asst. Professor - Department of Statistics
Mr. C. P. Ranjan	Asst. Professor - Department of Political Science
Dr. Sasmita Samal	Asst. Professor - Department of Chemistry
Ms. Usharani Sethi	Asst. Professor - Department of Commerce

On behalf of EHS Alliance Services

Name	Position	Qualifications
Dr. Uday Pratap	Lead	Ph.D. , PDIS, QCI – WASH, Lead Auditor ISO
	Auditor	14001:2015
Ms. Pooja Kaushik	Co-Auditor	M.Sc., Field Expert, QCI – WASH



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EXECUTIVE SUMMARY

Green auditing is an essential step to identify and determine whether the institutional practices are sustainable and ecological. Traditionally, we were upright and efficient users of natural resources. But over the period of time, excessive usage of resources like water, electricity, petrol, etc. have become habitual for everyone especially, in urban and semi-urban areas. It is actually the right time to check if we (our process) are consuming more than required resources? Whether we are using resources sensibly?

Green audit standardizes all such practices and provides an efficient way to use natural resources. In the time of climate change and resource exhaustion it is necessary to re-check the processes and convert then in to green and sustainable. Green audit provides an approach for the same. It also increases overall awareness among the folks working in institution towards the eco-friendly environment.

This is the second attempt to conduct green audit of this campus for fulfilment of NAAC criteria. This audit was mainly focused on greening indicators like consumption of energy in terms of electricity and fossil fuel, quality of soil, water usage, vegetation, waste management practices and carbon foot print of the campus. Initially a questionnaire was shared to know about the existing resources of the campus and resource consumption pattern of the students and staff in the campus.

GREEN AUDIT - ANALYSIS

1.1 GENERAL INFORMATION

1. Any Green Audit conducted earlier?

Yes, this is second external audit organized by the College

2. What is the total strength (people count) of the Institute?

Students Male: 1032 Female: 1268 Total: 2300

Teachers (including guest faculty) Male: 59 Female: 54 Total: 113

Non-Teaching Staff Male: 32 Female: 13 Total: 45

Total Strength Male: 1123 Female: 1335 Total: 2458



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What is the total number of working days of your campus in a year?

There are two hundred and eighty-three working days in a year.

4. Where is the campus located?

The campus is located at Raghunathpali, Rourkela, Odisha 769004 (India)

5. Which of the following are available in your institute?

Garden area	Available
Playground	Available
Kitchen	Available
Toilets	Available
Garbage Or Waste Store Yard	Available
Laboratory	Available
Canteen	Available
Hostel Facility	Available
Guest House	Not Available

6. Which of the following are found near your institute?

Municipal dump yard	Not in vicinity of institute
Garbage heap	No Garbage heaps
Public convenience	Public convenience is available
Sewer line	Approximately 2.0 KM sewer line within campus
Stagnant water	No stagnant water
Open drainage	No
Industry – (Mention the type)	No
Bus / Railway Station	Rourkela Bus Stop, Rourkela Junction Station
Market / Shopping complex	Available

1.2 WASTE MINIMIZATION AND RECYCLING

1. Does your institute generate any waste? If so, what are they?

Yes, Solid waste, Canteen waste, paper, plastic, horticulture, laboratories waste, e-waste, etc.

2. What is the approximate amount of waste generated per day? (in Kg approx.)

Biodegradable waste - 30 Kg Non-biodegradable waste -5 Kg Hazardous Waste - 2 Kg Others < 1 Kg





3. How is the waste managed in the institute? By Composting, Recycling, Reusing, Others (specify)

- > Food waste is collected into biogas plant and composting machines
- > Three Rain water storage are there in campus for water conservation
- > E-waste collection and management through recycled authorized vendor

4. Do you use recycled paper in institute?

Yes, college uses single sided used paper for rough work, assessment work and prints

5. How would you spread the message of recycling to others in the community?

Following are the ways through which college is spreading the awareness about recycling

- *Waste plastic collection drives*
- > Installation of Dustbins for waste plastic collection, e-waste collection and recycling
- > Tie-ups with authorized e-waste collection agency
- Awareness among the Students by Webinars, seminars, Sign Boards, Posters, etc.

 \triangleright

6. Can you achieve zero garbage in your institute? If yes, how?

Not yet achieved. Possible through waste management policy and planning. 1. Minimization of waste production

2. Awareness workshops & trainings for students and faculty on Waste management

1.3 GREENING THE CAMPUS

1. Is there a garden in your institute?

Yes, about 217796.96 Sq ft areas are developed as Gardens.

2. Do students spend time in the garden?

Yes, students spend around 2-4 Hours during winter.

3. Total number of Plants in Campus?

Plant type with	approx. count
Full grown Trees	80
Small Trees	250
Hedge Plants	1600
Grass Cover sqm	217796.96 Sq ft

4. Is the College campus have a Horticulture Department? (If yes, give details)

Yes, a Total 2 staff (maali) were deployed in the horticulture department





5. How many Tree Plantation Drives are organized by campus per annum?

Three Plantation Drives are Organized by the campus in the last FY. 300 plants were planted in this FY. Survival rate is more than 65%.

6. Is there any Plant Distribution Program for Students and Community?

Yes, Plantations distribution drives conducted in nearby Villages under Unnat Bharat.

8. Is there any Plant Ownership Program?

No

1.4 WATER AND WASTEWATER MANAGEMENT

1. List uses of water in your institute

Basic use of water in campus:

Drinking – 59.18 KL/month

Gardening – 509.90 Kl/month

Kitchen and Toilets – 455.96 KL/month

Others – 151.56 KL/month

Hostel - 1876.50 KL/Month

Total = 3053.10 KL/Month

2. How does your institute store water? Are there any water-saving techniques followed in your institute?

Available total water storage of the college is tanks on the terrace. *Saving Techniques*

- > Avoid overflow of water-controlled valves are provided in water supply system.
- Close supervision for water supply system.
- > Push taps are installed for water conservation
- Water Conservation awareness for new students
- Sprinklers usage for gardening and grass cover

3. Locate the point of entry of water and point of exit of waste water in your institute.

Entry - Water comes from Municipal corporation supply and borewells





Exit- From Canteen, Toilets, Hostel, bathrooms and Labs through covered drainage which is connected to sewer

4. Write down ways that could reduce the amount of water used in your institute

Basic ways:

- Close the taps after usage
- Water Conservation awareness for new students
- Maintenance and monitoring of valves in supply system to avoid overflow, leakage and spillage
- Push tap are installed to save water
- Water recycling and use of sprinklers for gardening
- 1.5 ANIMAL WELFARE

1. List the animals (wild and domestic) found on the campus (dogs, cats, squirrels, birds, insects, etc.)

20+ dogs, 10 Cats, 20+ butterfly species, 100+ Squirrels and 100+ Birds are found in campus. A variety of bird's species and other flora and fauna are available, so institute is doing their bit for bio diversity conservation.

2. Does your institute have a Biodiversity Program or a KARUNA CLUB?

Yes, Government Autonomous College's **Eco club** actively organizes awareness through various campaigns and activities including seminars, poster competition, etc.

1.6 CARBON FOOTPRINT - EMISSION & ABSORPTION

1. Electricity used per year - CO2 emission from Electricity

(Electricity used per year in kWh/1000) x 0.84 107807kWh/1000 x 0.84

= 107807/1000x0.84

= 90.56 tons

2. LPG/PNG used per year - CO2 emission from LPG/PNG

(LPG/PNG used per year in KG) x 2.99 2445 x 2.99 =2445 x 2.99 =7.31 tons



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3. Diesel used per year CO2 emission from HDS (Diesel)

(Diesel used per year in litres) x 2.68 =142 x 2.68 = 142 x 2.68 =0.38 tons

4. Transportation per year (car) CO2 emission from transportation (Bus and Car)

There are no college-owned vehicles =0.00 tons

Total CO2 emission per year cumulative by electricity usage + LPG + Diesel + bus and car is 98.25 tons

CARBON ABSORPTION BY FLORA IN THE INSTITUTION

There are 573 full-grown trees and 1045 semi-grown trees of different species, on the campus spread over 217796.96 sq ft.

Carbon absorption capacity of one full-grown tree 22 kg Co2 Therefore Carbon absorption capacity of 80 full-grown trees 573×22 kg Co2 = 12.61 tons of Co2.

The carbon absorption capacity of 1045 semi-grown trees is almost 30% of that of full-grown trees. Hence the carbon absorption 1045×6.8 kg of Co2 = 7.11 tons of Co2

There are approximately Hedge Plants 10512 of various species being raised in the gardens and grown in the areas where no buildings are built Carbon absorption of bush plants varies widely with their species. Certain bushes absorb very high level of Co2 where as some others absorb very low level of Co2. In the absence of a detailed scientific study, 200g of Co2, absorption is taken per bush (in consultation with Environmental Science specialists). Based on this, total carbon absorption of bushes is $10512 \times 200 \text{ g} = 2.10 \text{ ton of Co2}$

The lawns on the campus have buffalo grass, Mexican grass and indigenous grass species and cover a total area of 217796.96 sq. ft. Carbon absorption capacity of a 10 sq. ft. area of lawn is 1 g per day Therefore, carbon absorption by lawn area 217796.96 x 365 x 0.1 g Co2 = 7.95 tons Co2 per year.

The total carbon absorption capacity of the campus is 29.76 tons.





GREEN INITIATIVES BY CAMPUS

Solid Waste Management

- Collect paper waste produced on campus and collaborate with scrap dealers for recycling.
- o College does compost for solid waste management
- Reduce use of paper by supporting digitization of attendance and internal assessment records.
- Reduce requirement of printed books by updating the e-books and e-journals collection of the college library.
- Take initiatives to spread awareness amongst students about food wastage and ways of minimizing it.
- There is ban on single use plastic and plastic crockery in the campus.

Liquid Waste Management

- Maintain leak proof water fixtures.
- Minimize the use of water by constructing more Indian style toilets instead of western style toilets.
- Continued employment of a caretaker to take immediate steps to stop any water leakage through taps, pipes, tanks, toilet flush etc.
- Reuse of wastewater generated by the Reverse Osmosis (RO) system in washrooms.
- Urinals are installed in boys washroom to reduce water wastage

> E-waste Management

 College has a separate storeroom for the safe storage of electronic waste. After a certain interval of time college disposes of the E-waste to concerned agencies through the auction process.

Rain water storage

• College has rainwater storage system for better groundwater recharge. The stored water in this tank can be used for gardening purposes

> Air Pollution Reduction

• Personal Vehicles (Students) are not allowed in the campus





RECOMMENDATIONS

- Environmental parameters shall be included in purchase policy to achieve a cradle to grave approach for sustainability.
- > College should start drip irrigation to save water in campus
- Flow rate of taps should be checked, it should not be more than 2.5 litres/minute.
- Arrange training programmes on environmental management system and nature conservation for schools and local people.
- > Involve lower hierarchy staff in environmental awareness programmes and campaigns.
- More Messages should be displayed at various locations to Aware the People about Energy Savings
- Water Meter should be installed at every building of institute for monitoring of water consumption per capita.
- > Borewell permission should be taken from authorised government department
- Car-pooling practices can be adopted by campus to minimize air pollution. Increase in the display of environment-conscious posters/paintings/slogans for spreading awareness amongst students.
- Plant Ownership Program should be initiated Several Trees should be Planted and owned by Visitors as well as students. The Nameplates should also be displayed near the plants.
- Messages should be displayed at various locations to Aware the Peoples about Energy Savings
- > Green building guidelines for future expansion projects of the campus.





CONCLUSION

This audit involves considerable team discussions and meetings with key staff members on a variety of environmental-related topics. The eco club of Government Autonomous College promotes conservation of resources.

Overall 70% of Government Autonomous College is for landscaping. The college makes a significant effort to act in an environmentally responsible manner and takes into account the environmental effects of the majority of its activities. The recommendations in this report suggests some more ways in which the college can work to improve its practices and develop into a more sustainable institution.

It's important to begin a few things, such as initiating drip irrigation, and increase plantation drives. Additionally, we strongly advise to sign MOU with third party authorised vendors for waste management such as plastic, paper, metal, C&D, etc.

REFERENCE

- The Environment [Protection] Act 1986 (Amended 1991) & Rules-1986 (Amended 2010)
- > The Petroleum Act: 1934 The Petroleum Rules: 2002
- > The Central Motor Vehicle Act: 1988 (Amended 2011) and The Central Motor Vehicle
- Rules:1989 (Amended in 2005)
- Energy Conservation Act 2010.
- The Water [Prevention & Control Of Pollution] Act 1974 (Amended 1988) & the Water (Prevention & Control of Pollution) Rules – 1975
- The Air [Prevention & Control Of Pollution] Act 1981 (Amended 1987) The Air (Prevention & Control of Pollution) Rules – 1982
- The Gas Cylinders Rules 2016 (Replaces the Gas Cylinder Rules 1981
- E-waste management rules 2016
- Electrical Act 2003 (Amended 2001) / Rules 1956 (Amended 2006)
- The Hazardous Waste (Management and Handling and Trans-boundary Movement) Rules, 2008 (Amended 2016)
- > The Noise Pollution Regulation & Control rules, 2000 (Amended 2010)
- > The Batteries (Management and Handling) rules, 2001 (Amended 2010)
- Relevant Indian Standard Code practices



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ANNEXURE – PHOTOGRAPHS OF ENVIRONMENT CONSCIOUSNESS



Well maintained campus



New age building



Lush green campus



Sports Ground



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Paving stone installed in campus



Color coded dustbins



Ornamental plants in campus



Indoor plants in campus



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Classrooms as per NBC guidelines with more than 40% window ratio



Spacious and well equiped labs



Well equiped labs



Spacious Auditorium



ସରକାରୀ ସ୍ପ୍ରସ୍ଦିଂଶାସିତ ମହାବିଦ୍ୟାଳସ୍କ, ରାଉରକେଲା GOVERNMENT AUTONOMOUS COLLEGE, ROURKELA Sundargarh, Raghunathpali, Rourkela, Odisha





Smart Class rooms



Plantation drive by the students



Color coded dustbins



Herbal Garden



ସରକାରୀ ପ୍ରସ୍ୱଂଶାସିତ ମହାବିଦ୍ୟାଳସ୍କ, ରାଉରକେଲା GOVERNMENT AUTONOMOUS COLLEGE, ROURKELA Sundargarh, Raghunathpali, Rourkela, Odisha







Best out of waste activity



Rain water storage tanks



Push taps installed

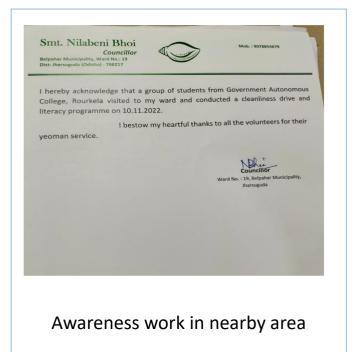


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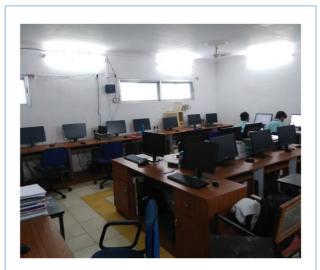


Natural bird nest in campus





Incinerators for Sanitary pads disposal



Computer Lab

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